

Memorandum

RECEIVED
DIVISION OF OIL AND GAS
SACRAMENTO

JUN 18 1 13 PM '82

To : R. Reid

Date : June 17, 1982

Subject: UIC Aquifer Exemptions

From : Department of Conservation—Division of Oil and Gas
Woodland

The following data is being forwarded in response to M. G. Mefferd's memo dated May 14, 1982.

Bunker Gas

Data requested has not been received from Amerada Hess Corp. It will be forwarded when available.

River Break Gas

Gulf Oil Corp., the operator of the project, intends to abandon the water disposal well. A Notice to Abandon was received May 24, 1982.

Sutter Buttes Gas

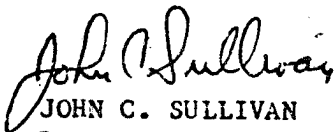
The Kione fm. is a major producing formation in the northern Sacramento Valley and produces gas in nearby fields. Information provided by the operator (Santa Fe Minerals (Calif.), Inc.) of the water disposal project is attached.

Union Island Gas

A recently received water analysis of the fluid in the aquifer prior to the start of injection indicates a TDS of 10,106 mg/l. Information provided by the operator (Union Oil Co. of Calif.) of the water disposal project is attached.

Wild Goose Gas

Data requested has not been received from Exxon Corp. It will be forwarded when available.


JOHN C. SULLIVAN
Deputy Supervisor

KPH:kw

Attachments (2)



santa fe minerals, inc. A Subsidiary of Santa Fe International Corporation

182 MAY 28 AM 9 43

DIVISION OF OIL AND GAS
RECEIVED

JUN 1 1982

WOODLAND, CALIFORNIA

DIVISION OF OIL AND GAS
RECEIVED

May 28, 1982

JUN 1 1982

WOODLAND, CALIFORNIA

Mr. John C. Sullivan
Deputy Supervisor
Division of Oil & Gas
117 West Main St.
Suite 11
Woodland, CA 95695

Water Disposal Well
B.C. 2 - #57
Sutter Buttes Gas Field

Dear Mr. Sullivan,

In reply to your letter of May 21, 1982, requesting information which qualify an aquifer for exemption. Due to the very short time limit involved I will attempt to provide as much data as immediately available.

In Reply to Item I of Attachment B:

The Kione zone is not currently serving as a source of drinking water. I have attached as attachments No. 1 and No. 2 geochemical Analysis of produced Kione water from Santa Fe operated wells in Sec 6, T15N, R2E. I can tell you that you cannot drink Kione water produced in the SBGF.

During the conversion of well #57 we perforated the Kione at 3,580' to 3,570' and swabbed the zone to recover formation water prior to injection, see DOG form 103 dated April 8, 1982. A sample of this water has been sent to Hornkohl Laboratories for Geochemical Analysis with instruction for a copy of the results to be sent directly to you, we also requested a TDS analysis.

In Reply to Item IV of Attachment B:

A: See above declaration. I have included analysis of our Domestic Water well water as Attachment No. 3, the well is 200' deep, will pump at 200 GPM, and while suitable for industrial use and livestock tastes so bad we buy our drinking water in town. Our water well is used during the summer for livestock and our neighbors garden. I have included analysis of some spring water from one of best springs in the area, never has completely dried up regardless of drought conditions as attachment No. 4. This spring water tastes horrible and sheep and wildlife are all that use the spring.

B: See forthcoming analysis of Kione water.

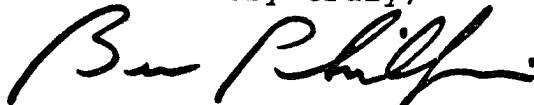
C: Based on pressure of 1,567 psi at a depth of 3,575' it is assumed the Kione Zone in Well #57 will surface water and possibly flow , no idea of any rates.

D: Top perforation of well #57 injection zone is at 3,077'. The deepest domestic well I know of is an orchard irrigation well located 2,500'± Southeast, this well was projected to drill to 500'±; however, they found so much suitable water at 350'± they quit drilling. DWR might know of deeper irrigation wells, I don't know of anybody that could afford to lift irrigation water 1,000'.

E: Location of well #57 is 1,228'N and 3,864'W of the SE Corner of Sec 5, T15N, R1E, M.D. B&M.

1. Nearest "Town" is the community of Meridian which is 2.6 Miles Southwest of #57.
2. Surface owners are James and Clareen Tarke, 3,450 West Butte Road, Sutter, CA, 95982.
3. All domestic water from relatively shallow wells (50' to 200'), irrigation and livestock water from wells and Butte Creek (part of Sutter Bypass System), all wells less than 1,000' deep. A few man-made ponds for retaining runoff in the Buttes, usually dry by mid-summer. Ownership of Butte Creek water in litigation for past 5-6 years in Federal Court.
4. None in this location.

Yours very truly,



Ben F. Phillips, Jr.

BFP/lc

Enclosures

HORNKOHL LABORATORIES, Inc.

CHEMICAL AND TESTING ENGINEERS

714 TRUXTON AVENUE

BAKERSFIELD, CALIFORNIA 93302

Laboratory No. 204549

August 17, 1970

Marked Well #64, Produced Water,
8-4-70.

Sample Water

Received August 8, 1970

Purchase Order #12636

Submitted by Santa Fe Minerals, Inc.
A Subsidiary of Santa Fe International Corporation
14367 Pass Road
Live Oak, California 95953
Attn: BEn Phillips

PALMER HYDROLOGY ANALYSIS

<u>Constituents:</u>		<u>Parts per Million</u>	<u>Grains per Gallon</u>	<u>Reacting Values</u>	<u>Reacting Values Per Cent</u>
Carbonates, CO ₃	---	0.0	0.00	0.00	0.00
Bicarbonates, HCO ₃	---	762.5	44.59	12.50	8.41
Chlorides, Cl	---	2184.0	127.72	61.60	41.43
Sulfates, SO ₄	---	11.5	0.67	0.24	0.16
Sulfides, S	---	0.0	0.00	0.00	0.00
Calcium, Ca	---	19.6	1.15	0.98	0.66
Magnesium, Mg	---	15.1	0.88	1.24	0.83
Sodium, Na	---	1659.0	97.02	72.12	48.51
Totals:	---	4651.7	272.03	148.68	100.00
Boron, B	---	24.89	1.46		
Hardness as CaCO ₃	---	111.0	6.49		
Salt as NaCl	---	--	210.58		
pH-Value @ 25°C.	7.8				
Primary Salinity	--	83.18			
Secondary Salinity	--	0.00			
Total Salinity	--	83.18	--	83.18	
Primary Alkalinity	--	13.84			
Secondary Alkalinity	--	2.98			
Total Alkalinity	--	16.82	--	16.82	
				100.00	
Per Cent Sulfates in Sulfates plus Chlorides			--	0.384	
Carbonate-Chloride Ratio			--	0.000	
Carbonate-Sulfate Ratio			--	0.000	
Alkali-Alkaline Earth Ratio			--	32.557	
Resistivity, Ohm Meters @ 25°C.			--	1.60	

Respectfully submitted,
HORNKOHL LABORATORIES, INC.

E. R. Starbuck, Jr.
E. R. Starbuck, Jr.,
Assistant Chief Chemist

ap

HORNKOHL LABORATORIES, Inc.

CHEMICAL AND TESTING ENGINEERS

714 TRUXTON AVENUE
BAKERSFIELD, CALIFORNIA

November 4, 1964

Laboratory No. 158,782

Marked 10/20/64 - Well #70 DST #2,
WED #1 2495 - 2500'

Sample Water

Received November 2, 1964

Submitted by Santa Fe Drilling Company
Route 2, Box 689
Live Oak, California

PALMER HYDROLOGY ANALYSIS

Constituents	Parts per Million	Grains per Gallon	Reacting V Values	Reacting Values Per Cent
Carbonates (CO ₃)	180.0	10.53	6.00	2.82
Bicarbonates (HCO ₃)	1128.5	65.99	18.50	8.69
Chlorides (Cl)	2900.6	169.63	81.80	38.41
Sulphates (SO ₄)	9.1	0.53	0.19	0.09
Sulphides (S)	0.0	0.00	0.00	0.00
Calcium (Ca)	75.2	4.40	3.76	1.77
Magnesium (Mg)	51.7	3.02	4.24	1.99
Sodium (Na)	2264.3	132.42	98.49	46.23
TOTALS	6609.4	386.52	212.98	100.0
Boron	55.55	3.25		
Hardness as CaCO ₃	400.00	23.39	8.00	
Salt as NaCl		279.63		
pH	8.0			
Primary Salinity	77.00			
Secondary Salinity	0.00			
Total Salinity		77.00		
Primary Alkalinity	15.46			
Secondary Alkalinity	7.54			
Total Alkalinity		23.00		
		100.00		
% Sulphates in Sulphates / Chlorides	--	0.234		
Carbonate - Chloride Ratio	--	0.073		
Carbonate - Sulphate Ratio	--	31.333		
Alkali - Alkaline Earth Ratio	--	12.295		

Resistivity @ 25°C is 1.13 ohm meters

Respectfully submitted,
HORNKOHL LABORATORIES, INC.,

Frank Hornkohl

Technical Director

HORNKOHL LABORATORIES, Inc.

CHEMICAL AND TESTING ENGINEERS

714 TRUXTON AVENUE

BAKERSFIELD, CALIFORNIA 93302

August 17, 1970

Laboratory No. 204547

Marked Domestic Water Well, Sec. 32,
T16N, R1E, M.O.B.+M, 8-4-70

Sample Water

Received August 8, 1970

Purchase Order #12636

Submitted by Santa Fe Minerals, Inc.
 A Subsidiary of Santa Fe International Corporation
 14367 Pass Road
 Live Oak, California 95953
 Attn: Ben Phillips

* * * * *

PALMER HYDROLOGY ANALYSIS

<u>Constituents:</u>		<u>Parts per Million</u>	<u>Grains per Gallon</u>	<u>Reacting Values</u>	<u>Reacting Values per Cent</u>
Carbonates, CO ₃	---	0.0	0.00	0.00	0.00
Bicarbonates, HCO ₃	---	211.7	12.38	3.47	40.63
Chlorides, Cl	---	19.9	1.16	0.56	6.56
Sulfates, SO ₄	---	11.5	0.67	0.24	2.81
Sulfides, S	---	0.0	0.00	0.00	0.00
Calcium, Ca	---	36.4	2.13	1.82	21.31
Magnesium, Mg	---	16.3	0.95	1.34	15.69
Sodium, Na	---	25.5	1.49	1.11	13.00
Totals:	---	321.3	18.78	8.54	100.00
Boron, B	---	0.05	0.00		
Hardness As CaCO ₃	---	158.0	9.24		
Salt as NaCl	---	--	1.91		
pH-Value @ 25°C.	7.3				
Primary Salinity	--	18.74			
Secondary Salinity	--	0.00			
Total Salinity	--	18.74	--	18.74	
Primary Alkalinity	--	7.26			
Secondary Alkalinity	--	74.00			
Total Alkalinity	--	81.26	--	81.26	
				100.00	
Per Cent Sulfates in Sulfates plus Chlorides	--				29.989
Carbonate-Chloride Ratio	--				0.000
Carbonate-Sulfate Ratio	--				0.000
Alkaline-Alkaline Earth Ratio	--				0.351
Resistivity, Ohm Meters @ 25°C.	--				24.50

Respectfully submitted,
 HORNKOHL LABORATORIES, INC.

E. F. Starbuck, Jr.
 E. F. Starbuck, Jr.,
 Assistant Chief Chemist

HORNKOHL LABORATORIES, Inc.

CHEMICAL AND TESTING ENGINEERS

714 TRUXTON AVENUE
BAKERSFIELD, CALIFORNIA 93302

August 17, 1970

Laboratory No. 204548

Marked Spring Water, Sec. 34,
T16N, R1E, M.D.B+M., 8-4-70

Sample Water

Purchase Order #12636

Received August 8, 1970

Submitted by Santa Fe Minerals, Inc.
A Subsidiary of Santa Fe International Corporation
14367 Pass Road
Live Oak, California 95953
Attn: Ben Phillips

PALMER HYDROLOGY ANALYSIS

<u>Constituents:</u>		<u>Parts per Million</u>	<u>Grains per Gallon</u>	<u>Reacting Values</u>	<u>Reacting Values Per Cent</u>
Carbonates, CO ₃	---	18.0	1.05	0.60	8.24
Bicarbonates, HCO ₃	---	153.7	8.99	2.52	34.62
Chlorides, Cl	---	8.5	0.50	0.24	3.30
Sulfates, SO ₄	---	13.4	0.78	0.28	3.84
Sulfides, S	---	0.0	0.00	0.00	0.00
Calcium, Ca	---	29.6	1.73	1.48	20.33
Magnesium, Mg	---	16.1	0.94	1.32	18.13
Sodium, Na	---	19.3	1.13	0.84	11.54
Totals:	---	258.6	15.12	7.28	100.00
Boron, B	---	0.10	0.01		
Hardness as CaCO ₃	---	140.0	8.19		
Salt as NaCl	---	--	0.82		
pH-Value @ 25°C.	8.5				
Primary Salinity	---	14.28			
Secondary Salinity	---	0.00			
Total Salinity	---	14.28	--	14.28	
Primary Alkalinity	---	8.80			
Secondary Alkalinity	---	76.92			
Total Alkalinity	---	85.72	--	85.72	
				100.00	

Per Cent Sulfates in Sulfates plus Chlorides	--	53.781
Carbonate-Chloride Ratio	--	2.497
Carbonate-Sulfate Ratio	--	2.146
Alkali-Alkaline Earth Ratio	--	0.300
Resistivity, Ohm Meters @ 25°C.	--	2.55

Respectfully submitted,
HORNKOHL LABORATORIES, INC.

E. R. Starbuck, Jr.
E. R. Starbuck, Jr.,
Assistant Chief Chemist

Union Oil Company of California
P.O. Box 1074
Coalinga, CA 93210

DIVISION OF OIL AND GAS
RECEIVED



MAY 28 1982

WOODLAND, CALIFORNIA

May 25, 1982

RE: Water Disposal Well "Galli" #1
Union Island Gas Field

Mr. John C. Sullivan, Deputy Supervisor
Division of Oil and Gas
117 W. Main Street, Suite No. 11
Woodland, California 95695

Dear Mr. Sullivan:

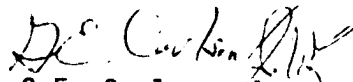
In response to your letter of May 21, 1982, we are supplying the information, as requested, for exemption of our "Galli" #1 disposal well from the provisions of the Underground Injection Control program.

The "Galli" #1 well disposes of produced water (from the Union Island Gas Field) into the Mokelumne River formation (5310-5720'). The well is located approximately 6 miles north of the town of Tracy and 11 miles southwest of Stockton on property owned by Galli Farms (L. Galli). The Mokelumne formation contains a brackish water (10,106 mg/l TDS) that is not suitable for drinking and is therefore not used as a source of drinking water (according to the DWR). This formation lacks any unusual geologic features (geology was supplied with our letter of May 19, 1977 when the well was converted for disposal.)

Drinking water wells in the area of the Union Island Gas Field are between 1000' and 1500' deep (according to the DWR), therefore, our injection interval is in excess of twice their depth. These wells yield water at rates as high as 2000-3000 gal/min. (according to the DWR). Delta and river water serve as alternate sources of water in this area.

Attached is a copy of the analysis of the Mokelumne formation water.

Very truly yours,


G.E. Carlson, Agent

JWL:jmm

Attachment

NELSON LABORATORIES
AGRICULTURAL CHEMISTS AND CONSULTANTS
 1145 WEST FREMONT STREET
 STOCKTON, CALIF. 95203

July 28, 1977

DIVISION OF OIL AND GAS
 RECEIVED

MAY 28 1977

WOODLAND, CALIFORNIA

Union Oil
 P. O. Box 547
 Stockton, California

THE FOLLOWING ARE THE RESULTS OF ANALYSIS OF A SAMPLE OR SAMPLES AS RECEIVED FROM YOU BY THIS LABORATORY:

NAME OF MATERIAL: Water Samples *Formation Water* RECEIVED: 7-21-77

*From Galli #1
 Mokelumne Sand*

BILL G. SPADLIN

AUG 2 1977

A. E. KODURA

AUG 24 1977

Carbonate (CO ₃)	ppm	None
Bicarbonate (HCO ₃)	ppm	305
Chloride (Cl)	ppm	5920
Sulfate (SO ₄)	ppm	9
Nitrate (NO ₃)	ppm	< 1
Calcium (Ca)	ppm	196
Magnesium (Mg)	ppm	106
Sodium (Na)	ppm	3570
Percent Sodium (%)		89
Total Dissolved Solts	ppm	10106
Electrical Conductivity (mmhos/cm)		21.4
		7.6

This sample is very unsatisfactory for irrigation purposes, primarily due to the extremely high chloride, sodium and total salt levels.

Results are reported on
 a basis of 100%
 unless otherwise noted

NELSON LABORATORIES

BY

Memorandum

To : Robert A. Reid, E.P.A. Coordinator

Date : May 26, 1982

RECEIVED
DIVISION OF OIL AND GAS
MAY 28 1 26 PM '82

Subject: Exemption Criteria

From : Department of Conservation—
Division of Oil and Gas

Place: COALINGA

COALINGA FIELD

Santa Margarita Formation (Class III criteria)

- A. This aquifer is not a source of drinking water.
- B. There are no water wells listed by DWR.
- C. Location
 - 1. Underlies the city of Coalinga.
 - 2. Too complex to list or research.
 - 3. City water supplied by California Aqueduct system.
 - 4. No unusual geology.
- D. 8244 ppm TDS.
- E. No wells available to test.

Etchegoin-Jacalitos Formation (Class II criteria)

- A. This aquifer is not a source of drinking water.
- B. This aquifer is known to be hydrocarbon bearing at commercial levels.
- C. This formation has been approved for surface disposal by the Water Quality Control Board.

GUIJARRAL HILLS FIELD

Etchegoin-Jacalitos (Class III criteria)

- A. This aquifer is not a source of drinking water.
- B. There are no water wells listed by DWR.
- C. Location
 - 1. 4 miles to Huron and 6 miles to Coalinga.
 - 2. Owned predominately by Chevron U.S.A. Inc.
 - 3. Irrigation water obtained from California Aqueduct system.
 - 4. No unusual geology.
- D. 9400 ppm TDS.
- E. No wells available to test.

HELM FIELD

Tulare-Kern River (Class III criteria)

- A. This aquifer is not a source of drinking water.
- B. DWR lists 18 irrigation wells the deepest of which is 1020 feet deep. The top of the shallowest injection well interval is 1910 feet in one well with the rest all being below 2000 feet.
- C. Location
 - 1. 1 mile to Lanare, 2 miles to Helm and Burrel and 4 miles to Riverdale.
 - 2. Too complex to research or list.
 - 3. All water is supplied from wells.

(continued)

Exemption Criteria
Page Two

- 4. No unusual geology.
- D. 5100 to 23,900 ppm TDS dependent on depth.
- E. No wells available to test.

RIVERDALE FIELD

Pliocene Formation (Class III criteria)

- A. This aquifer is not a source of drinking water.
- B. DWR lists 10 irrigation wells the deepest of which is 555 feet with perforations to 455 feet. The top of the shallowest injection well interval is 1840 feet with most of them below 2000 feet.
- C. Location
 - 1. $1\frac{1}{2}$ miles from Lanare, 4 miles from Burrell and partially underlies the community of Riverdale.
 - 2. Too complex to research or list.
 - 3. All water is supplied from wells.
 - 4. No unusual geology.
- D. 4788 to 16,200 ppm TDS dependent on depth.
- E. No wells available to test.

TURK ANTICLINE

San Joaquin Formation (Class III criteria)

- A. This aquifer is not a source of drinking water.
- B. DWR lists 1 irrigation well with a depth of 1196 feet. Top of injection interval is 2970 feet.
- C. Location
 - 1. 4 miles from Cantua Creek and 10 miles from Five Points.
 - 2. Appears to be Estate of James MacDonald- inadequate time to research.
 - 3. Unknown- inadequate time to research.
 - 4. No unusual geology.
- D. 3700 to 4440 ppm TDS.
- E. No wells available to test.

The problem of ownership of the land is sheer numbers. Coalinga field would have 5,000 to 10,000 or more separate owners since the aquifer underlies the city and other fields would be in the 100's. Yield of wells is determined by pump tests and since there is no commercial market for salt water no one has ever made a test of these aquifers.



Richard F. Curtin
Deputy Supervisor

Data for Attachment B Criteria

III

- A. I hereby declare that the aquifers listed below are not a source of drinking water.


Deputy Supervisor

San Ardo Field

- B. T.23S, R.10E, Sec. 1, T.23S, R.11E, Secs. 6 and 7.

Department of Water Resources has no record of any well in the area of this project.

- C. 1. Santa Margarita, Monterey "D" and Monterey "E" project sands are six miles from Bradley and five miles from San Ardo.
2. The above aquifers are on private land.
3. Alternate water sources are the Salinas River and ground water in the terraces to the east.
4. There is no unusual geology.

- D. TDS concentration in Santa Margarita is 3700 ppm.

TDS concentration in Monterey "D" sand is 4600 ppm.

TDS concentration in Monterey "E" sand is 6400 ppm. As there is some minor amount of 10⁶ API oil in this sand, it should not have been listed as a non-hydrocarbon producing zone.

- E. Water yields were not determined.

Monroe Swell Field

- B. T.19S, R.7E, Sec. 19

Department of Water Resources has no record of any water well in the area of this project.

- C. 1. Santa Margarita project sand is five miles south of Greenfield and ten miles northwest of King City.
2. The above aquifer is on private land.
3. Alternate water sources are the Salinas River and ground water in the terraces to the west.
4. There is no unusual geology.

- D. TDS concentration in Santa Margarita sand was not determined; water samples taken at 1590' tested 3700 ppm NaCl.

Note: The part of the injection zone below 1555' may be Monterey.

- E. Water yields were not determined.

DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

146 SOUTH OJAI STREET, P. O. BOX 67

SANTA PAULA, CALIFORNIA 93060

(805) 525-2105



June 8, 1982

Ramona Oil FieldPico Fm.

Operator - Texaco Inc.

Operator Contact - Mr. Buchanan, Senior Prod. Engr. (213-385-0515)

Fresh water wells in vicinity - none

FW Source for Operations - FW well 1/2 mile north, drilled by operator.

Ownership of land - Private

Oat Mountain FieldUndifferentiated Marine

Operator - Union Oil Co. of Calif.

Operator Contacts - David Salzman, Prod. Engr. (805-525-6672)
Ed Hall, Geologist, (805-656-7600, Ext. 229)

Fresh water wells in vicinity - none

Source of FW - piped in from valley

Ownership of land - Private and Federal

South Tapo Canyon FieldPico Fm.

Operator - Union Oil Co. of Calif.

Fresh water wells in vicinity - none

Source of FW - piped in

Ownership of land - Private

Simi FieldSespe Fm.

Operator - Union Oil Co. of Calif.

Fresh water wells in vicinity - none

Wells drilled for FW by operator, ab'd. due to poor quality and low volumes.

Ownership of land - Private

Fresh Water

Ramona Field	4N-18W	Sec's. 12 & 13
	4N-17W	Sec's. 7, 8, 18, & 17
Oat Mountain	3N-17W	Sec. 24
	3N-16W	Sec's. 19 & 20
Simi	3N-17W	Sec's. 29, 30, 31, & 32
	3N-18W	Sec's. 31, 32, 33, 34, 35, & 36
	2N-18W	Sec. 6
South Tapo Canyon	3N-17W	Sec's. 7 & 8
	3N-18W	Sec's. 12 & 13

Examination of water well records and surface water quality records fails to point out any water wells within the administrative field boundaries of the fields in question.

District 2 Class IV Injection Zone

FIELD NAME	Union Oil	FORMATION ZONE	TDS of ZONE WTR Prior to Injection	TDS of Injected Wtr	VOLUME INJECTED	DATE INJECTION STARTED	Declaration aquifer is not a current source of drinking water	TDS Level in formation fluids	YIELD of WTR	DEPTH (3x deepest well according to DWR)	LOCATION	Surface distance to existing towns	Ownership of Land	Alternative Wtr Sources	Unusual Geology	ECONOMIC ANALYSIS
S. TAPOCYN PICO	1900 ppm NaCl	600 ppm NaCl	1,903,000	1148	not a Source	N/A	N/A	N/A	70/BSN47W VEIS 3N-16N	~ 4mi	Private	Piped In	None	7	None	

District 2 Class III Injection Zones

FIELD NAME

FORMATION ZONE

TDS of ZONE WTR Prior To Injection

TDS of Injected WTR

VOLUME INJECTED Bbls Cum.

INJECTION STARTED

Declaration aquifer is not a current source of drinking water

Depth (2X deepest drinking water well according to DWR)

LOCATION

Surface distance to existing forms

Ownership of Land

Alternate wtr source

Unusual geology

TDS LEVEL in formation fluid

YIELD OF WTR

BASE of FW

Principle Operator

BAHONA PICO	5,000 ppm NaCl	15,300 ppm NaCl	2,793,000	6 51	Not a Source	N/A	Secs R&B 4N-18W 5N-18W 2N-18W	>4mi	Private	Piped in	None	N/A	Unk	200-300	Texaco
OAT MTN. UNDIFF.	4,800 ppm NaCl	23,000 ppm NaCl	91,000	4 56	Not a Source	N/A	24-3N-17W 19E-20 3N-16W	~5mi	Private & Fed	Piped in	None	N/A	Unk	None	Union
SIMI SESPE	4,300 ppm NaCl	25,500 ppm NaCl	695,000	6 48	Not a Source	N/A	6-2N-18W 29-32 3N-17W 31-34 3N-18W	~1mi	Private	Water well 1/2 mile North	None	N/A	Unk	None to 1300	Union

5-18-82 by R.L.H.

Memorandum

To : R. Reid

RECEIVED
DIVISION OF OIL AND GAS
JUL 19 2 00 PM '82

Date : July 15, 1982

Subject: UIC AQUIFER EXEMPTIONS

From : Department of Conservation—Division of Oil and Gas
~~Sacramento~~ Woodland

The following data is provided to supplement my memo of June 17, 1982.

Bunker Gas	Information provided by the operator (Amerada Hess Corp.) of the water disposal project is attached.
River Break Gas	Gulf Oil Corp., the operator of the project, abandoned the only water disposal well in the field during June 1982. Gulf's producing well which had supplied all of the disposed water was also abandoned during June 1982.
Sutter Buttes Gas	The current disposal well of Santa Fe Minerals (Calif.), Inc. was converted to water disposal status during February 1982. A recently supplied water analysis of the fluid in the aquifer prior to the start of injection indicates a TDS of 18,400 mg/l.
Wild Goose Gas	Information provided by the operator (Exxon Corp.) of the water disposal project is attached.

John C. Sullivan
JOHN C. SULLIVAN
Deputy Supervisor *JS*

KPH:kw

Attachments(2)

AMERADA HESS CORPORATION

July 7, 1982

2692 AMERADA ROAD
P. O. BOX 128
RIO VISTA, CALIFORNIA 94571-0128
707-374-6461

DIVISION OF OIL AND GAS
RECEIVED

JUL 8 1982

Kenneth P. Henderson
Division of Oil and Gas
117 West Main Street, Suite No. 11
Woodland, California 95695

WOODLAND, CALIFORNIA

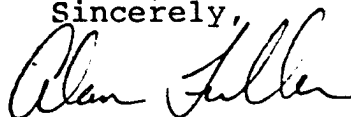
Re: Criteria to Exempt Aquifers Water Disposal Well B.G.Z.U.
#601, Bunker Gas Field

We have answered the following questions regarding E.P.A.'s criteria for exempting aquifers for salt water disposal at B.G.Z.U. #601 to the best of our knowledge. Please let us know if B.G.Z.U. #601 has received an exempt status.

- I Not currently serving as a source of drinking water - The formation at 3020'-3050' and 3080'-3100' is not being used as a source of drinking water in the B.G.Z.U. #601 area. There are several other fresh water aquifers above this formation that would be utilized.
- IV Less than 3000 TDS - Aquifer situated at depth or location which makes recovery of water for drinking purposes economically or technologically impractical.
 - A. Declaration aquifer is not a current source of drinking water - See answer to question I.
 - B. TDS level in formation fluids - An analysis run February 4, 1974 on a sample that was collected January 16, 1974, show a TDS of 1215 Mg/litre.
 - C. Yield of water - See attached (Dixon Wells and Physical Data).
 - D. Depth (3x deepest well according to DWR) - See attachment (Dixon Wells and Physical Data).
 - E. Location
 - 1. Surface distance to existing towns - The City of Dixon is 6 miles northwest of B.G.Z.U. #601. Vacaville is 6 miles west of B.G.Z.U. #601.

2. Ownership of land - David Comber.
3. Alternative Water sources (surface and ground water) - All of the water used for drinking in the surrounding Dixon area comes from ground water wells.
4. Unusual Geology - There are no fresh water aquifer outcroppings in the Dixon area. The well has been used for salt water disposal since 1975, and a cumulative total of 388,000 Bbls. of water have been injected since that time.
5. Economic analysis - Not available.

Sincerely,

A handwritten signature in cursive script, appearing to read "Alan Fuller".

Alan Fuller
Petroleum Engineer

CAF:fyl

CALIFORNIA WATER SERVICE COMPANY

1720 NORTH FIRST STREET • P. O. BOX 1150 • SAN JOSE, CA 95108 • (408) 298-1414

June 4, 1982

Mr. Alan Fuller,
Petroleum Engineer
Amerada Hess Corporation
2692 Amerada Road
P.O. Box 128
Rio Vista, California 94571-0128

Dear Mr. Fuller:

The following information on the Dixon domestic water supply is provided in response to your letter to Mr. Flint Saylors dated May 27, 1982.

1. Nine wells currently are used to supply water for the Dixon domestic system.
2. See attached map for our Dixon service area and wells locations.
3. See attached tabulation for wells and physical data.
4. We do not have alternative sources of water for supplying the Dixon domestic water system.
5. Maximum depth of future domestic wells is indeterminant at this time, but should be considered to be at least 1,000'.

Sincerely,



G. W. Adrian
Engineer of Water Quality

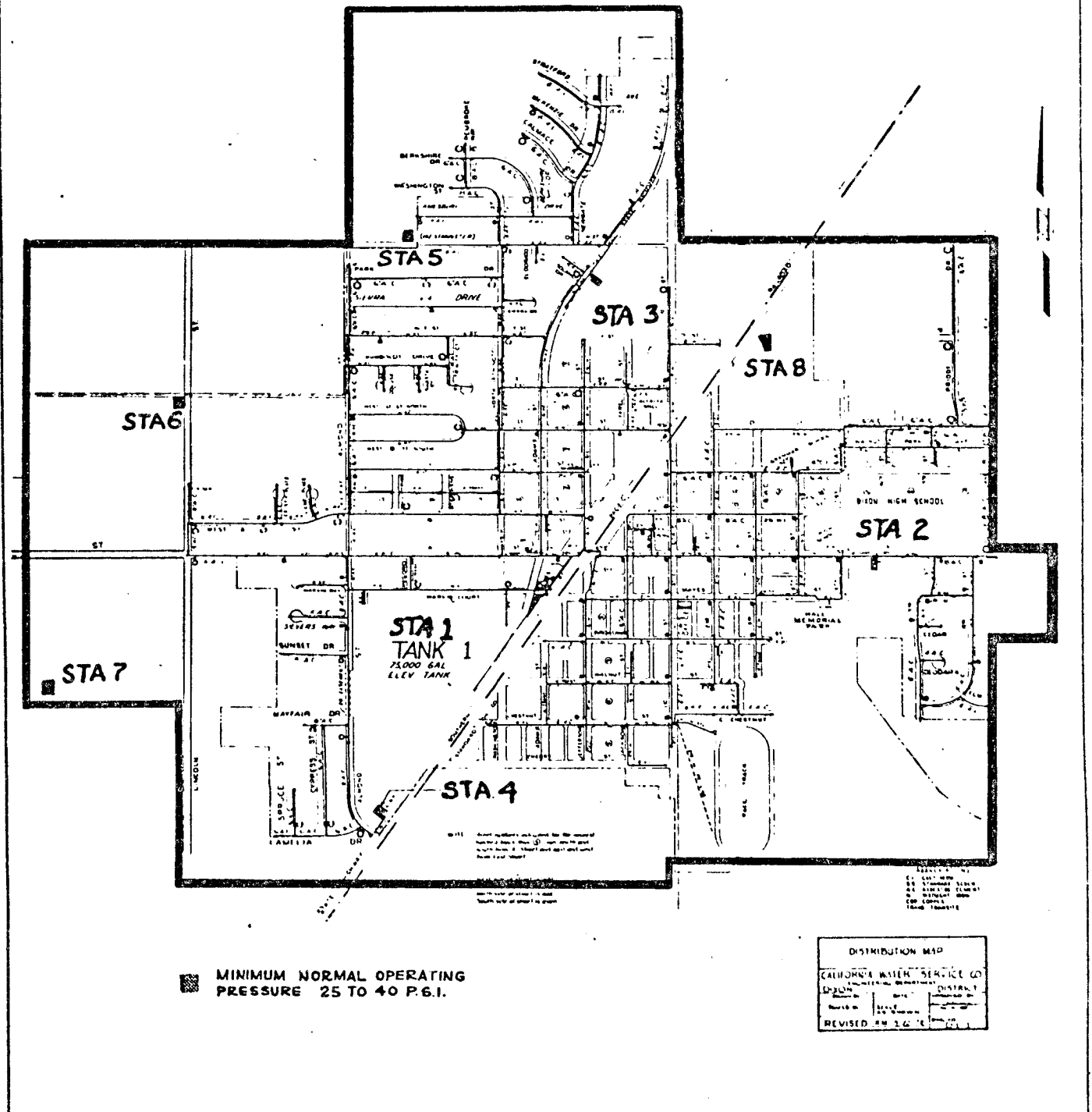
GWA:ap
cc: Flint Saylors, DIX

Enc.

DIXON WELLS
AND PHYSICAL DATA

<u>WELL NO.</u>	<u>Q (gpm)</u>	<u>WELL DEPTH (ft)</u>	<u>DEPTH OF PERFORATIONS (feet)</u>
1-02	100	540'	466-486 505-511
1-03	500	540'	317-324 465-484 498-503
2-01	700	600'	185-218 495-503
3-01	1000	602'	156-336 360-366 384-576
4-01	680	608'	130-145 215-224 260-285 400-410 430-440 470-480 616-664
5-01	700	650'	330-630
6-01	950	650'	235-385 410-520
7-01	950	822'	420-800
8-01	630	860'	400-850

SERVICE AREA MAP
DIXON DISTRICT



(To be inserted by utility)
Advice Letter No. 580

Issued by
Don Houck
Don Houck

(To be inserted by Cal. P.U.C.)
Date Filed OCT 13 1977

Decision No. _____

Vice President

Effective NOV 12 1977

DIVISION OF OIL AND GAS
RECEIVED

JUL 9 1982

EXXON COMPANY, U.S.A.

POST OFFICE BOX 80 • VENTURA, CALIF. 93143

July 7, 1982

WOODLAND, CALIFORNIA

PRODUCTION DEPARTMENT
VENTURA DISTRICT

E.C. HUTCHINSON
DISTRICT MANAGER

Re: Water Disposal Well
"Wild Goose Gas Unit 1" WD1
Location: Butte County
Section 17
Township 17N
Range 1 E

John C. Sullivan
Division of Oil and Gas
117 West Main Street, Suite No. 11
Woodland, California 95695

In regard to your letter of May 21, 1982, the requested information is herein provided concerning the Wild Goose Water Disposal Well No. 1. This information is provided in order to determine whether the aquifer into which water is being injected may be exempt from the provisions of the Underground Injection Control Program.

Response to Section IV items A through E of the Environmental Protection Agency's "Criteria to Exempt Aquifers" is listed below. Section I is addressed in the response to Section IV, item A.

A. Declaration aquifer is not a current source of drinking water.

The aquifer into which the subject well injects is not a source of drinking water. Water is injected into the Undifferentiate Non-Marine Eocene formation from 1448 - 2102'. According to the Department of Water Resources, the base of the fresh water sands is from 800' to 1200'. The deepest well in Township 17N is 740', which is used for irrigation. Domestic wells, from which drinking water is produced, are no deeper than 200'.

B. TDS level information fluids.

The calculated NaCl content is 2000 PPM. The NaCl content is based on the Resistivity of offset wells at the depth of the subject aquifer.

C. Yield of Water

According to the Department of Water Resources publication "Evaluation of Ground Water Resources", Bulletin 118-6, Pg 131, there are 17 wells located in township 17N which yielded 11M ACFT of ground water in 1970.

D. Depth

Water is being injected into the aquifer at a depth of 1448' to 2102'. According to the Department of Water Resources, domestic wells used for drinking purposes are no deeper than 200'.

E. Location

1. Surface distance to existing towns.

The injection well is in Butte County, approximately 10 miles northeast of Colusa.
The surface location is: 1935' S & 60' W
FR. N. 1/4 COR. SEC. 17. MD. B.E.M.
Sec. 17, TWP 17N, Rge 1E

2. Ownership of Land

Wild Goose Duck Club is the surface owner.

3. Alternative water sources

An alternate water source for township 17N is surface water from the Sacramento River.

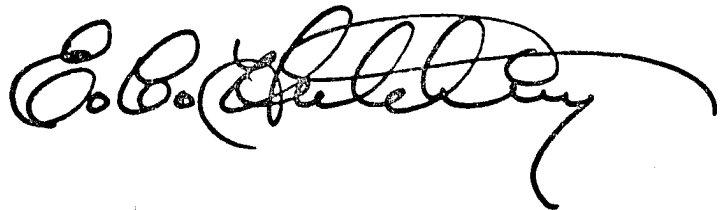
4. Unusual Geology

None

F. Economic Analysis

Per Mr. Kenneth P. Henderson's telephone conversation with Ms. Deanna Lyle, this information will be provided by the Environmental Protection Agency.

I hope this information will be of use in qualifying the subject aquifer for exemption.



Memorandum

To : R. Reid

JUL 20 1 51 PM '82

Date : July 19, 1982

Subject: UIC Aquifer Exemptions

From : Department of Conservation—Division of Oil and Gas
~~Spencer~~ Woodland *db*

Below are some additional comments on the Bunker Gas field and Wild Goose Gas field water disposal projects.

The Bunker Gas field water disposal project was approved in May 1973. At that time Amerada Hess Corp. proposed injecting into the Wineman sands from 6100' to 6180'. Surface injection pressure was found to be too high to inject into that zone and the operator proposed an alternate zone. Approval to inject into Undiff. nonmarine sands from 3020' to 3100' was given in December 1973. Water disposal commenced in January 1975 using well "BGZU" 601 and approximately 390,000 barrels have been injected to date. Water quality in the injection zone was 1,200 mg/l TDS and the Injection fluid averages 11,000 mg/l TDS. The operator is committed to the "BGZU" 601 wellsite since produced-fluid flow lines have been laid from the producing wells to the site and the condensate/water separation facilities as well as holding tanks are located at the site. Alternatives to the present operation include:

1. Ceasing all injection into the field by
 - a. hauling produced water (11,814 bbls in 1981) to one of several disposal wells 10-15 miles away.
 - b. shutting-in the high-water producing well (75,041 Mcf of gas in 1981; 5% of operator's 1981 Bunker Gas production) and hauling remaining produced water (1,137 bbls in 1981) to another disposal well 10-15 miles away.
2. Injecting higher quality water into the present zone by
 - a. shutting-in the high-salinity-water producing well (75,041 Mcf of gas in 1981) and injecting remaining water (approx. 3,600 mg/l TDS) into "BGZU" 601.
3. Injecting produced water into a different zone by
 - a. attempting to recompleate the present well in a deeper zone where poorer zone water qualities would exist.
 - b. attempting to convert a different well in the field to water disposal status in a deeper zone.

Of the above alternatives, 3a. appears to be the most acceptable. After expending funds for the rework operation, though, the operator may find that the required surface injection pressure is not within allowable limitations. A recompletion attempt would be preferable to injection continued as present.

The Wild Goose Gas field water disposal project was approved in July 1969. Exxon Corp. (formerly Humble Oil & Refining Co.) proposed drilling a water disposal well and injecting into Undiff. Marine and Ione sands from 1500' to 2100'. Well "Wild Goose Gas Unit 1" WD1 was completed in November 1969 with perforations from 1447' to 2102'. Water disposal commenced in November 1969 and approximately 825,000 barrels have been injected to date. Water quality in the injection zone was 2,800 to 5,000 mg/l TDS and the injection fluid averages 21,400 mg/l TDS. This water disposal well has been in existence for a considerable amount of time and the operator has laid a flow line from the high-water producing well directly to the water disposal well. Alternatives to the present operation include:

1. Ceasing all injection into the field by
 - a. hauling produced water (38,426 bbls in 1981) to another operator's disposal well 10 - 15 miles away.
 - b. shutting-in the high-water producing well (181,942 Mcf of gas in 1981; 78% of operator's 1981 Wild Goose Gas production) and disposing of remaining produced water (177 bbls in 1981) at a disposal site or disposal well.
2. Injecting produced water into a different zone by
 - a. attempting to convert a different well in the field to water disposal status in a deeper zone where poorer zone water qualities would exist.

If the operator must abandon the present project, alternative 2a. appears to be the most acceptable.

John C. Sullivan
JOHN C. SULLIVAN
Deputy Supervisor *KPH*

KPH:kw